

SOME PRACTICAL DEDUCTIONS FROM PERSONAL EXPERIENCE IN THE TREATMENT OF APPENDICITIS.*

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NOTWITHSTANDING the large and rapidly increasing experience in operating for appendicitis, there seems still to be a wider divergence in the opinions held and the methods practised than can fairly be attributed solely to temperamental differences among those who hold and practise them. And upon at least two points—the wisdom and character of interference in the gravest form of cases and drainage—this divergence is so great that the views held on one side are directly opposed to and condemnatory of those held on the other. As a contribution toward the possible establishment of more uniformity in opinion and practice I have collated my personal hospital statistics for the past four years and beg now to place them before you. The period of four years was chosen because, while brief enough to insure practical uniformity of practice, it is yet, I think, long enough to protect against the usual errors of chance.

The services are those of the New York and the Hudson Street Hospitals. The former covers a total of about sixteen months—four services of about four months each between October, 1903, and February, 1907, and a few intermediate cases. The latter covers my personal work during 1903-1906, about thirty months. To avoid misapprehension I may add that, while the list is wholly operative, yet it excludes no admitted case that died; cases which recovered without operation are not included. The New York Hospital list was made by the Librarian from the card index, and its completeness and accuracy are supported by contemporaneous reports made to

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the Board at the end of each term of service. The Hudson Street Hospital list was made by the house surgeon from the bound volumes of case reports for the four years.

The New York Hospital service presumably differs but little, if at all, from that of any other large city hospital, and from private practice mainly in that a somewhat larger proportion of the cases are probably first seen in the later stages of the disease. In the Hudson Street Hospital service this difference is rather more marked, for the community which it serves is poorer and less well provided with private medical advice. Of course, in a hospital the provision for operating and safeguarding the patient is in some respects better than in private.

A classification of the cases for the purpose of this paper is not easily to be made, for the symptoms, the gross pathological changes found at operation, and the apparent gravity of the cases do not closely correspond. It has long been the practice in the laboratory of the New York Hospital to subject all appendices removed at operation to a systematic examination, and the results of many of these examinations form part of the histories. They show quite uniformly a series of changes of an inflammatory and ultimately ulcerative character, starting in the mucosa. Of these, the lowest, apparently representing recovery from a moderate inflammatory attack, is an atrophy of the mucosa with local or general narrowing of the lumen. Next is a round-cell infiltration of the mucosa, extending more or less through the other coats and reddening or even roughening the surface and sometimes associated with partial necrosis of the mucosa. Then comes "a fibrino-purulent exudate" in all the coats, with partial or complete necrosis of the mucosa, and in the later stages ulceration and perforation of the entire wall, the latter apparently taking place with special frequency at points corresponding to enteroliths of various sizes. The perforation may occur promptly, on the first day, and in one case was absent on the eighth day, although pain, tenderness and rigidity had been marked throughout.

The grade of peritoneal reaction does not correspond closely with the condition of the appendix or with the length of

time since the onset of the attack. A general peritonitis, shown by abundant turbid serum throughout the cavity, may be present by the second day and with only a partial necrosis of the mucosa of the appendix and a round-cell infiltration of its wall. In 2 of the 4 cases, of this kind, of the list the appendix was not perforated. And many cases of abscess, walled in or free, and of localized collections of turbid serum coexist with an appendix that shows to the naked eye only hyperæmia of the surface and stiffness and enlargement of more or less of its length, and under the microscope any of the changes from thickening of the mucosa to its necrosis, and from round-cell to fibrino-purulent infiltration of the coats.

I have, therefore, roughly grouped the cases according to the character and extent of the peritoneal reaction. Some of the dividing lines are necessarily arbitrary and somewhat vague, and some of the groups might perhaps as fairly be combined with each other as separated.

Group I is of the cases of general peritonitis. In all there was abundant turbid serum or even thin pus throughout the peritoneal cavity.

Group II includes the cases in which similar exudates were found beyond the immediate neighborhood of the appendix and pelvis, but not everywhere.

In Group III this reaction was limited to that neighborhood and to the hollow of the pelvis.

In Group IV there was an abscess completely walled off, with or without adjacent peritoneal reaction.

Group V is composed of those numerous cases with which all are so familiar—the “acute suppurative,” the “acute gangrenous,” and some of the “acute catarrhal” forms; the appendix is swollen, rigid, congested or perhaps grayish in color,—sometimes free or with few adhesions, sometimes buried amid them or behind the cæcum or colon and then pliable and softened by inflammatory changes.

Group VI includes the milder cases, the subsiding attacks, some of the recurrences, those in which the pain seems to have been due to an obstruction of the lumen of the appen-

dix rather than to an acute inflammation, those, in short, in which the inflammation is but slight.

Group VII includes the "interval" operations.

The cases are as follows:

Group.	New York Hospital.	Hudson Street Hospital.
I. General peritonitis.....	3.....	1
II. Extensive peritonitis....	5.....	4
III. Local and pelvic.....	9.....	6
IV. Closed abscess.....	16.....	6
V. Acute appendicitis.....	24.....	11
VI. Subacute appendicitis...	7.....	3
VII. Interval operations....	3.....	0
Total	67.....	31
	(No deaths.)	(1 death.)

All of the New York Hospital cases recovered, and all of the Hudson Street Hospital cases except one. The fatal case was in Group II—extensive peritonitis with a perforated appendix; he survived until the eighth day. It is but fair to add that the clean record of the New York Hospital list would have been broken had it not been for my enforced absence on one occasion. The case was an urgent one of extensive peritonitis on the fourth day; another surgeon operated; the patient left the table in good condition but died fifteen minutes later with symptoms of pulmonary embolism.

The main principle of the operative treatment has been to do the least that would probably be sufficient to accomplish the object, whether that were the arrest of an appendicitis or of a peritonitis. The work is done rapidly, the incisions are as small as the conditions permit, the intestines handled as little as possible and usually protected with flat sponges (not gauze pads) as soon as the peritoneal cavity has been opened.

In 9 of the 98 cases, in which the position of a palpable mass made approach from the median line advisable, the curved transverse incision with longitudinal separation of the recti (the incision which I habitually use instead of median laparotomy) was employed. In all the others McBurney's intermuscular "gridiron" incision was used. My preference for

the latter has long been unshaken and is, I think, unshakable, and I deem it one of the most valuable of the many valuable things we owe its distinguished author. It not only leaves the wall unweakened after recovery, but it also wholly avoids injury to the nerve supply of the rectus. With care and patience it gives ample room in most cases for the necessary intra-abdominal work, and if more space is needed it can be easily had by extending the cut in the fascia across a portion of the sheath of the rectus and drawing that muscle inward, or, if room must be made upward, by cutting upward alongside the rectus for an inch or so. The work ended, this supplementary incision is closed with interrupted sutures of chromic catgut, and I have seen no ill consequences follow. In the 98 cases it was used 5 times. The extension into the sheath of the rectus is noted in only 6 of the histories, but I am confident that it was made to a slight extent in several others.

As soon as the cavity has been opened, and if it is dry, the finger is cautiously introduced to determine the situation of the appendix and the general conditions. Of the simple cases it is not worth while to speak, for the technique of the removal of the appendix presents no serious question. If the finger finds a mass, one or two flat sponges are pressed in and tuckd down on the lower side to crowd back the intestines from the iliac fossa and protect them and the hollow of the pelvis from possible contact with pus; then the finger seeks lines of least resistance in the mass and is cautiously pressed onward, usually between the mass and the posterior parietes, while an assistant stands ready with stick-sponges. As soon as pus is felt or seen it is quickly sponged away as it flows out from the little abscess, and when the flow has ceased the sponges are passed into the cavity until it has been thoroughly dried. Then the finger again enters the abscess cavity and seeks to free the appendix. It seems to me advisable to do by touch as much as can be so done, rather than to make wide exposures in order to see. One can generally recognize by its greater resistance the portion of the meso-appendix which contains the artery, and can safely tear through the rest if he cannot readily

expose it for ligation. Such bleeding as ensues soon stops, or the point can be exposed and caught.

If the appendix can be thus found and freed I usually secure the stump by simply tying it with a catgut ligature after having cauterized its interior with the fine Paquelin point. When the base of the appendix and adjoining wall of the bowel are not inflamed and can be brought into easy reach I use the purse-string silk suture and invagination of the stump; but I never use it when the wall has been softened by inflammation. In two cases the appendix has separated at its junction with the cæcum, leaving a rather large opening. This I closed with sutures in the usual way.

When the appendix is found detached, or has been torn away by the manipulations used to free it, I make no great search for its stump if it is not readily accessible, but leave it for spontaneous closure. Three stumps in this list were thus left untied with no recognizable ill results. A fecal odor may persist for some time in the discharge, but not longer than in other cases where the stump has been tied, or there may be a slight admixture of feces in the discharge for a few days.

If the appendix is not accessible without a wide exposure and extensive separation of adhesions, if the patient is old and feeble or his condition grave, I content myself with simply wiping out the cavity and providing drainage. In 7 of the cases in this list the appendix was thus left untouched, and in only 2 of them did it give rise to further trouble; in each after an interval of two months. In one, which had fully healed, the patient returned with the usual symptoms of an attack; I opened him along the scar, found a small foul abscess and the appendix easily accessible, and removed it. In the other a sinus had persisted; I enlarged it and easily found and removed the appendix. Of the 98 cases of the list, in 37 the stump was invaginated with a purse-string suture, and in 49 it was simply tied.

Of course, it is well that an inflamed appendix should be removed; there is probably even no important loss to the patient in the removal of a healthy appendix, but I am sure

that the removal of the appendix is not necessary to the cure of an appendicitis and possibly not even to the patient's reasonable security against another attack. At least, in one case in which for various reasons I felt constrained to limit my interference very narrowly, I saw a simple half-inch opening in the abdominal wall, with immediate escape of pus and drainage for a few days, followed by complete freedom from attacks for a period that is now nine years. And yet the patient had previously suffered for two years from repeated attacks.

In the young, such caution may be superfluous; but in the old, whose tissues and organs have felt the strains of competition, luxury, or want, whose abdominal walls are fat and flaccid, the less draft we make upon them the better. And so, too, with those who are very ill: let the operation be limited to the life-saving indications, and let us not take a counsel of perfection which adds a strain that may be beyond the patient's powers of resistance.

If the pus is not encapsulated, if it lies free between the cæcum and the wall, perhaps with some free thin exudate showing at the incision, it is treated in the same way—carefully sponged out and the area dried. So, too, if there is also a collection within the pelvis; a few introductions of sponges on handles will remove it. Occasionally, when the collection has been larger than usual, I have removed it by washing with salt solution, using a double tube which afforded an easy escape for the wash and aiding the escape by keeping the sides of the incision wide apart. In the cases of extensive and general peritonitis, likewise, I have used the same tube, but always under low pressure and with free escape, and using only small quantities of water, just enough to effect the removal of so much of the exudate as would easily come. The main reliance has been upon gentle sponging. This seems to me safer than large incisions and abundant washing, and I am not sure that even less would not be sufficient in those graver cases, as it has proved to be in the less extensive peritonitides of the III and IV Groups. And it leaves the patient, in the case of survival, free from the weaknesses and discomforts of large

abdominal scars. Space is lacking to give the histories of these graver cases in detail. I must leave you to estimate their gravity upon the length and continuity of the list and the extent of the peritoneal reaction. In addition, in the few of the 12 recoveries of the first two groups in which the leucocyte and differential counts have been preserved, the divergence from the normal line set by Dr. Gibson was on the dangerous side and the bacterial examination showed mixed streptococcus and *B. coli communis* infections.

Drainage was used in all of the first four groups and in 29 of the 48 cases of the last three groups. Three forms of drains were used: first, and most frequently, the cigarette drain; secondly, small strips of gauze, either alone or in conjunction with the cigarette; and in 6 cases, where the need seemed to be slight, only a strip of rubber tissue. In the cases of the first three groups the cigarette drain was passed down into the pelvis, and sometimes a second one, or a strip of gauze passed upward toward the liver or toward the opposite side. In one of the cases of general peritonitis a second opening was made on the left side for a drain. These cigarette drains have always been removed or much shortened within three or four days, and the gauze strips have been taken out on the second or third day. The retention of the short drains leading to the abscess cavity or the stump of the appendix has been determined by the amount and character of the discharge. They have been used also in a few clean cases in which there has been much oozing or tearing of adhesions. In one case of large faecal abscess lying close by the promontory of the sacrum and reached by the median route, the drain was passed through a counter-opening in the loin.

I am strongly convinced of the value of drainage, and would not willingly forego the feeling of security which it gives. I am quite ready to concede that many of the cases in which I use it would recover without it; but what weighs upon me is the uncertainty lest there may be some among them in which its absence will mean an added danger, another operation, or even death. Its disadvantages are not more, I

think, than trifling inconveniences—a brief delay in the final cicatrization of the wound and a momentary pain in the withdrawal. The rubber drain has not even those if it is removed on the first or second day. Why should we leave even a small post-operative exudate or bleeding to be cared for by the peritoneum when it is so easy to remove them?

Finally, it has been urged, with statistics to support, that in grave cases abstention will save more lives than operation. This list contains 13 cases of general or extensive peritonitis with only one death. Suppose that not all of the cases should be counted as grave. Cut the list in half and call it 6 cases with one death. Can abstention do better? Is not the question rather one of the extent and character of the operative interference? Let that be brief and limited to what can be done quickly, easily, and with the minimum of exposure and handling of the intestines, and even, if necessary, to drainage alone. Surely nothing is lost by providing an escape for the exudate and reducing the task of the body to taking care of the bacilli and the toxins which it contains. I do not even ask for the washing of the cavity. As I have said, I use it only in moderation as a gentle means of quickly removing a large amount of exudate, with no thought of making that removal complete. In short, let us remember that we are dealing with very ill patients whose strength is already taxed to the utmost by their disease and who have no reserve with which to meet the drafts we may make upon them, and let us reserve our ideally complete operations for the young, the strong, for those appendices whose potentiality for harm has as yet been only slightly manifested.